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AUTHOR Givvin, Karen B.; And Others
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ABSTRACT

This study investigated the nature and validity of teacher judgments about student motivation as part of a project related to the teaching of mathematics. The study examined: (1) the degree of correlation between teachers' and students' assessments of students' motivation regarding mathematical topics; (2) the stability of teachers' and students' ratings of students' motivation across time; and (3) the coherence of ratings across different beliefs, goals, behaviors, and feelings. Teachers of grades 4-6 (N=28) rated 6 "target" students in each of their classes at the beginning of the school year, again after completing a fractions unit and a measurement unit, and at the end of the school year. The teachers measured each target student's mastery orientation, performance orientation, help-seeking, positive emotion, negative emotion, and self-perceptions of ability. All students completed a questionnaire on their own beliefs, values, goals, and feelings associated with math, within the same time frame. Students' ratings of their own motivation over time and across mathematical contexts were somewhat stable. Teachers judged students' motivation as more stable over time and context, and more coherent than students judged themselves. Results suggested that teachers may need assistance in making more differentiated and reliable assessments of beliefs, goals, and behaviors in students that are associated with motivation and learning. (Rating tables are attached.) (CK)

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Teachers' Understanding of Their Students' Motivation[1]

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Karen B. Givvin, Deborah J. Stipek, Julie M. Salmon
University of California, Los Angeles

Valanne L. MacGyvers
Southwestern Louisiana State University

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Teachers make myriad judgments about various aspects of their students' motivation. In everyday conversations, teachers describe some students as self-confident or enthusiastic, and others as lacking in self-confidence, disinterested in the academic curriculum, overly dependent, or anxious about performance. These perceptions of students can influence teachers' instructional and other decisions that may, in turn, affect student learning. This study was designed to examine the nature and validity of teacher judgments about student motivation.

The study was embedded in a larger project related to the teaching of mathematics. The National Council of Teachers of Mathematics (NCTM) "Standards" stresses motivation as an important factor in student learning and it promotes positive motivation as a goal of reform-minded mathematics. Teachers, therefore, need to be attentive to student motivation. To be able to devise appropriate adaptations to their instructional activities and to their classroom environments, teachers need to be able to assess their students' beliefs, goals, and behaviors associated with motivation, as well as their mathematical understanding.

The first goal of the present study was to examine how well teachers' assessments of their students' motivation corresponded to students' own assessments of their motivation at various times throughout the year and related to various mathematical topics. Second, the study examined the stability of both teachers' and students' ratings of students' motivation across time. And third, it examined the coherence of ratings across different beliefs (e.g., about competence), goals (e.g., to learn versus to perform), behaviors (e.g., help-seeking), and feelings related to motivation.

Previous research suggested that we might find systematic differences in teachers' and students' judgments of students' motivation. According to the fundamental attribution error (Ross, 1977), individuals tend to over-attribute others' behavior to dispositions and to underestimate the effect of the immediate context. Conversely, when judging their own behavior, individuals tend to over-estimate the contribution of the situation and underestimate dispositional factors.

We therefore hypothesized that teachers would make more dispositional judgments of students' on the motivation dimensions studied than students would

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make of themselves. Thus, we expected teachers to perceive greater stability over time and contexts than students would report about their motivation. We also expected teachers to have more holistic, less differentiated perceptions of students' motivation than students would report.

Method

Participants

Twenty-eight fourth- through sixth-grade teachers from elementary schools throughout Los Angeles County participated. They varied in teaching practices; some were reform-minded and others used more traditional methods. From each of these teacher's classes, six target students were chosen. Selection was based on a fractions test administered during the first month of the school year. From each class, two relatively high-, two median- and two low-performing students were selected, with one girl and one boy in each group. The students were ethnically diverse and predominantly low in socioeconomic status. All students selected could speak and read English. Of the original sample of 158 students, 96 completed the survey at the beginning of the year. This diminished to 62 by the end of the year, due to attrition.

Procedure

Teachers were asked to rate the six "target" children in their class four times: (1) at the beginning of the school year, (2) after completing a fractions unit, (3) after completing a measurement unit, and (4) at the end of the school year. The questions in the first and last questionnaires referred to "math tasks" in general; the second and third questionnaires referred specifically to fractions and measurement, respectively.

Items were measured on a Likert-type scale (1 = not at all/not much/almost never; 6 = very/a great deal/almost always). Teachers rated each target student's: (1) mastery orientation; (2) performance orientation; (3) help-seeking; (4) positive emotion; (5) negative emotion; and (6) self-perceptions of ability. Subscale alphas and sample items are in Table 1.

All students completed a questionnaire of their own beliefs, values, goals, and feelings associated with math. A student questionnaire was given at the same four times that teacher ratings of the target students were done. Table 2 summarizes the scales created from these student questionnaires. The subscales--mastery orientation, performance orientation, help-seeking, positive emotions, negative emotions, and perceptions of ability--were conceptually matched to the teacher scales.

Results

Associations Between Teachers' and Students' Ratings

The first set of analyses examined the degree to which teachers' ratings of their students' motivation were associated with their students' own ratings. As seen in Table 3, for perceived ability, teachers' ratings of their students' motivation were significantly correlated with students' own ratings at all of the four administrations. For mastery orientation, teachers' ratings of their students' motivation were associated with students' own ratings at three of the four administrations. For help-seeking, positive emotions, and negative emotions, teachers' ratings were associated with students' at two of the four administrations. In general, teachers' ratings of their students' motivation at the end of the year more closely matched their students' own ratings than they did at the beginning of the year.

Stability Over Time and Context

The next set of correlations was conducted to determine the degree to which students' ratings of their own motivation were stable over time and across context. Students' ratings across each of the four administrations (beginning-of-the-year, fractions, measurement, end-of-the-year) were significantly correlated. For example, students' ratings of their positive emotion at the beginning of the year were significantly correlated with their ratings of their positive emotion when learning fractions, when learning measurement, and at the end of the year. For a summary of students' ratings across time and type of mathematics, see Table 4.

The same correlational analyses were conducted to see to what degree teachers' ratings of their students' motivation were stable over time and across contexts. Teachers' ratings of their students across each of the four administrations (beginning-of-the-year, fractions, measurement, end-of-the-year) were highly correlated. As can be seen from the pattern of the average correlations presented in Table 4, as predicted, teachers tended to perceive greater stability in students' motivation over time than was reflected in students own ratings.

Coherence Across Motivation Dimensions

The next set of analyses examined the coherence of students' ratings of their own motivation across the five motivation dimensions. The reliability across all six subscales was obtained separately for each administration (beginning-of-the-year, fractions, measurement, end-of-the-year). For example, for the fractions administration, an alpha was obtained to examine the degree to which students' ratings of their ability, mastery-orientation, performance orientation, positive emotion, negative emotion, and help-seeking were interrelated. The alphas, shown on Table 5, were generally low, indicating that students' self-ratings on one motivation dimension were only modestly associated with their self-ratings on

other motivation dimensions.

The same type of analyses were conducted to examine the coherence of teachers' ratings of their students' motivation across the six motivation dimensions. Much higher alphas were obtained for teachers, suggesting that teachers made more global, less differentiated judgments of students than students made of themselves on the different motivation dimensions.

Conclusions

Students' ratings of their own motivation over time and across mathematical contexts were somewhat stable. Thus, the perceptions students had of themselves when they came to the classroom were maintained to some degree throughout the year. There was, however, considerable variability from one assessment time (and math topic) to another, indicating considerable malleability in students' motivation, at least according to their own perceptions. These results suggest that children with maladaptive motivational orientations can be helped by adjustments in the nature of instruction and evaluation.

Teachers' assessments corresponded modestly to students' assessments, especially at the end of the year. The correlations were low, however, even for dimensions such as emotions and help-seeking, which one might expect to be easily observed. There are at least two compatible explanations for the discrepancies between teachers' and students' own perceptions. Students may not reveal their thoughts and feelings in observable behavior, or teachers may not be particularly observant of the information students' provide.

As predicted, teachers judged students' motivation as more stable over time and context and more coherent than students judged their own motivation. In general, teachers appeared to make relatively global judgments about students' motivation, and to maintain their judgments over the school year, despite the considerable variability reported by students. Thus, while teachers tended to see students as generally positive or negative on a constellation of motivation dimensions, and to persist in their perceptions throughout the year, student's were much more differentiating and changeable in their perceptions on these motivation dimensions.

To the degree that teachers fail to differentiate motivation-related dimensions and fail to perceive changes in students on those dimensions over time and across contexts, they will be less able to make appropriate adaptations to their instructional activities and to their classroom environments. The results suggest that teachers may need assistance in making more differentiated and reliable assessments of beliefs, goals, and behaviors in students that are associated with motivation and with learning,

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Table 1

Teachers' Ratings of Students' Motivation

Subscale Name	Average Alpha[1]	# of items	Sample Item
Mastery Orientation	.93	6	How concerned about really understanding math/fractions/measurement concepts is s/he? (as opposed to just getting work done or getting good grades)
Performance Orientation	.48[2]	2	How concerned about others' views is s/he (e.g., grades, teacher/parental approval)?
Help-Seeking	.61[2]	2	How does s/he react when s/he encounters difficulty math/fractions/measurement? (asks classmate/teacher for help)
Positive Emotions	.92	3	How much does s/he enjoy math/fractions/measurement work?
Negative Emotions	.89	5	How much does s/he evidence confusion/distress/embarrassment/frustration while working on math/fractions/measurement tasks?
Perceived Ability	--	1	How confident is the child in his/her math/fractions/measurement ability?

[1] Average of four assessments

[2] Correlation

Table 2

Students' ratings of their own motivation

Subscale Name	Average Alpha[1]	# of items	Sample Item
Mastery Orientation	.67	5	How much did you care about really understanding math/fractions/ measurement?
Performance Orientation	.44[2]	2	When you want to know how well you are doing in math, which of these are important to you? (getting more right or wrong than other kids)
Help-Seeking	.45[2]	2	What do you do when you are having trouble with your math/ fractions/ measurement work? (ask my teacher/ another student for help).
Positive Emotions	.63	3	How did you feel when you were doing math/fractions/measurement work? (interested; proud)
Negative Emotions	.72	5	How did you feel when you were doing fractions/measurement work? (confused, embarrassed, frustrated, worried/upset)
Perceived Ability	.62	3	How good are you at math/fractions/ measurement?

[1] Average of four assessments

[2] Correlation

Table 3

Correlations between teachers' ratings of target students and students' ratings of themselves

Motivation Dimension	Beginning of the Year	Fractions	Measure-ment	End of the Year
Perceived Ability	.24*	.50***	.39**	.29*
Mastery Orientation	.29**	.17	.29*	.33*
Performance Orientation	-.08	-.08	-.03	.01
Help-Seeking	-.08	.09	.43***	.29*
Positive Emotions	.15	.25*	.27*	.22
Negative Emotions	.14	.12	.31**	.40**

*p < .05, **p < .01, ***p < .001

Table 4

Coherence of students' and teachers' ratings of motivation across time/context

Motivation Dimension	Students *mean correlation* *(range of correlations)*	Teachers *mean correlation* *(range of correlations)*
Perceived Ability	.49 (.39-.61)	.77 (.63-.85)
Mastery Orientation	.51 (.36-.66)	.78 (.74-.81)
Performance Orientation	.44 (.29-.60)	.55 (.41-.73)
Help-Seeking	.34 (.21-.53)	.48 (.33-.60)
Positive Emotions	.47 (.35-.60)	.74 (.68-.80)
Negative Emotions	.47 (.28-.62)	.67 (.50-.83)

Table 5

Coherence of students' and teachers' ratings of motivation across dimensions (alphas)

Administration	Students	Teachers
Beginning of the Year	.31	.73
Fractions	-.03	.69
Measurement	.20	.70
End-of-Year	.25	.75